

From: EPA/ADEQ

TO: AF

Re: Approval and Implementation of Revised Draft Final Addendum #2 Remedial Design and Remedial Action Work Plan for Operable Unit 2, Revised Groundwater Remedy, Site ST012, Former Williams AFB

Dear Mr. Mook:

The U.S. Environmental Protection Agency (EPA) and the Arizona Department of Environmental Quality (AZDEQ) (hereafter the Regulatory Agencies) have reviewed the above-mentioned document to determine if the proposed remedial action is acceptable for implementation at the ST012 Site.

Conceptually, sulfate reduction (i.e., enhanced sulfate reduction/EBR using injected sulfate as an electron acceptor, and afterwards MNA relying on natural sulfate reduction) seems likely to be useful for degradation of the COCs dissolved in groundwater. However, given the considerable mass of source material (i.e., mobile/residual LNAPL) remaining at Site ST012, the practical efficacy of EBR/MNA towards achieving Site remedial goals in the desired timeframe is highly uncertain from the Agencies' perspective.

The Agencies understand that the Air Force wants to initiate EBR as described in the Work Plan to begin addressing subsurface contamination at the site and to obtain data on which to base future contracts. However, the Agencies remain unconvinced that EBR will be effective at achieving remediation goals within the timeframe identified in the Work Plan, and we do not believe that the Work Plan will provide the data required in order to determine if EBR is working as intended. Therefore, in order for the Agencies to approve the draft Work Plan and thus the implementation of EBR at the site, the following items must be addressed/implemented:

1. Monitoring wells not used for injection and extraction should be used as the primary source of data for determining contaminant degradation, geochemical conditions representative of the aquifer volumes, and EBR endpoints.
2. Install x number of monitoring wells in x locations so as to represent the lateral and vertical conditions at the site
3. Provide specific sampling locations to obtain LNAPL BTEX concentration data in a statistically valid and defensible way. If adequate LNAPL cannot be collected from monitoring wells then soil cores must be obtained to get this data. BTEX, and particularly B concentration decline within the LNAPL must be measured in order for EBR to be determined to be successful.
4. Develop formal Standard Operating Procedures before initiating EBR
5. Conduct more frequent monitoring once sulfate has been injected in the subsurface
6. **WHAT DECISION CRITERIA DO YOU WANT INCLUDED??**
7. ??Agreement must be reached with the agencies on a model to be used to predict remediation timeframes, and the parameters to be used in the model. The model will be updated with data from 12 (18?) months of monitoring of system after EBR initiated.

Commented [DE1]: They are already proposing to use other wells as monitoring wells (see Figures 3-2 to 3-4). However, the wells they are proposing to use for monitoring are not correctly located. Which takes us to #2 below

Commented [DE2]: We need to specify where the wells will be located.

Commented [WU3]: DFP: Monitor COC content of LNAPL to demonstrate depleting LNAPL site-wide of COCs sufficient to protect ground water (i.e., to COC LNAPL concentrations low enough that LNAPL cannot supply COCs to groundwater above MCLs). If they claim to be depleting COCs in LNAPL sufficiently to protect groundwater, then they need to show that, by sampling/analyzing the LNAPL on a regular basis. As we have discussed, sampling/analyzing the LNAPL moving into wells is a really easy way to start doing this. But eventually there should be a site-wide LNAPL sampling.

Commented [DE4]: My opinion is that this is not critical up front

Commented [DE5]: We have to specify the frequency

Commented [DE6]: Other things that should be required include completing the characterization, providing recirculation which will provide containment (not only of the B but also the sulfate, presently their modeling shows that significant quantities of sulfate will be lost downgradient (see for example Figures F-4 and F-19).

8. ??Agreement must be reached with the Agencies on the contents of the Decision Tree (Appendix J),
9. Complete EBR baseline data from each zone must be collected, validated, analyzed, and reported prior to initiating EBR. Microbial and geochemical data collected prior to the initiation of SEE or during SEE are not considered representative of current site conditions.
10. The EBR Checklist that the regulatory agencies provided on June 21, 2017 will provide the basis for monitoring EBR and transitioning from EBR to MNA.
11. Conduct a field test of EBR in the UWBZ as specified in the Final Remedial Design and Remedial Action Work Plan (Amec, 2014) before completing the EBR design.
12. Conduct monthly monitoring of sulfate concentrations in monitoring wells for the first 12 months after the initiation of sulfate injection and report comparisons between model predictions and measures of sulfate concentration in monitoring wells (e.g., graph of predicted sulfate concentration at each monitoring well and the field measures of sulfate as a function of time).
13. Estimates for the time of remediation (TOR) must be provided. The revised draft final addendum did not include any supporting data or calculations to indicate sulfate reduction as designed would achieve remedial goals in the desired timeframe. Sulfate utilization rates estimated from the push-pull test in the LSZ do not yield an estimate for the time to attain remedial goals.
14. Wells identified as "other wells" on Figures 3-2 through 3-4 of the Revised EBR Work Plan Addendum #2 must be incorporated into the monitoring program in order to provide a complete understanding of contaminant conditions and sulfate distribution within the former ITZs.
- DPP: Develop specific (e.g., benzene concentration in LNAPL of XX at YY time after EBR implementation) milestones based on COC concentrations in the site GW and LNAPL; the milestones would be derived from predictive modeling of COC attenuation over time.

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Commented [dCK7]: ADEQ's additions

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If the Air Force is unwilling to implement the items above, then we will invoke formal dispute per the Federal Facility Agreement.....